

Integrated Safety Management at the Neutrinos at the Main Injector SBO Construction Project

1.0 Line Management Responsible for Safety

1.1 Fermilab Policy

Responsibility for environment, safety, and health (ES&H) is defined in the Fermilab ES&H Manual (FESHM) Chapter 1030. It states:

“The Laboratory Director is ultimately responsible for safety, but each person at Fermilab is responsible for establishing knowledgeable control of the hazards encountered at the Laboratory. The necessary level of knowledgeable control is established by a combination of formal training and common sense.”

Other documents which support this policy include:

1.2 Neutrinos at the Main Injector (NuMI) Project Plan

1.3 Contract Between Ragner Benson Inc. and Fermilab

2.0 Clear Roles and Responsibilities

It is very important with a project of the complexity of the NuMI project that roles and responsibilities be clearly understood. This is especially pertinent to the NuMI civil construction project. Roles and responsibilities for those organizations involved in the NuMI project are discussed in various references, such as Director's Policy Manual, FESHM, Project Management plan, NuMI Construction Management Office (NCMO) roles and responsibilities document, the contract with Ragner Benson, and Ragner Benson Inc.'s ES&H & ISM Plan. The key roles and responsibilities are discussed here:

2.1 Fermilab Roles and Responsibilities

2.1.1 NuMI Project Manager

The position's roles and responsibilities are incorporated into the NuMI Project Management Plan. This individual is responsible for administering, planning, organizing, and controlling the NuMI project technical, cost, schedule and ES&H objectives. All ES&H follows line management up to the Project Manager, who therefore has the responsibility to assure that the appropriate competence and training exists

at all levels, and that the appropriate processes consistent with the ISM five core functions are in place.

2.1.2 NuMI Project ES&H Coordinator

The NuMI Project ES&H Coordinator has been assigned to assist the NuMI Project Management Team in constructing/fabricating, installing, commissioning, and operating all aspects of the NuMI project by providing ES&H oversight of these activities. During the civil construction phase, the NuMI Project Coordinator assures that ES&H has been integrated into the work planning by Ragner Benson and Fermilab. He works to promote open lines of communication between the construction management office, Ragner Benson, and the ESH Section, as well as with future subcontractors working. He keeps the NuMI Project Manager informed of current potential upcoming ES&H issues. The NuMI Project ES&H Coordinator is responsible for completing reports such as ORPS and CAIRS. In the event of an incident at the NuMI construction site, the NuMI ESH Coordinator or the NCMO Field Safety Coordinator will take control of the scene from the Fire Department to assure evidence preservation.

2.1.3 NCMO Construction Manager

The NuMI Project Construction Manager is responsible for assuring that the civil construction activities are conducted in accordance with applicable ES&H requirements. He does this through monitoring subcontractor activities, interfacing with ES&H support personnel, reviewing incident reports, interfacing with Construction Coordinators, etc.

2.1.4 NCMO Field Safety Coordinator

The NCMO Field Safety Coordinator has been assigned oversight of the civil construction project's ES&H compliance program and is responsible for enforcing the contractual safety provisions. He is responsible for responding to internal communications for ES&H issues, maintaining a daily report, review hazard analysis, documentation of inspection in the database, interfacing with Construction Coordinators and ES&H support personnel, and incident investigation. He performs daily site observations for compliance with the subcontractor's safety plan and hazard analyses. He works with the construction coordinators to identify unsafe work practices and to support their line management responsibilities for safety. He interfaces with other ES&H oversight personnel to assure open lines of communication. He communicates status of the ESH activities to the NuMI ESH Coordinator and the NuMI Construction Project Manager. In

the event of an incident at the NuMI construction site, the NuMI ESH Coordinator or the NCMO Field Safety Coordinator will take control of the scene from the Fire Department to assure evidence preservation.

2.1.5 NCMO Construction Coordinators

The Construction Coordinator serves as the point of contact between the subcontractor and Fermilab. The Harza Construction Coordinators are responsible for all the tasks defined for a Fermilab Construction Coordinator as found in FESHM 7010 and Exhibit A of the contract with Healy. They are responsible for assuring that the construction subcontractor(s) are complying with applicable ES&H requirements. Specific activities include: review of hazard analysis provide comments to field safety coordinator, documented inspections through daily reports, communication with Ragner Benson for addressing identified ES&H concerns.

2.1.6 NCMO Environmental Coordinator

The FESS Environmental Coordinator provides environmental support to the NuMI program through a part-time matrix assignment. He is responsible for conducting weekly oversight inspections of the construction site and providing any findings to the Construction Coordinator for assuring action. He reviews and accepts subcontractor environmental protection plans and performs periodic risk analysis. He interfaces with external environmental inspectors and other Fermilab environmental personnel to assure integration of NuMI activities with Fermilab's environmental protection program. He communicates status of the environmental protection activities to the NuMI ESH Coordinator and the NuMI Construction Project Manager.

2.1.7 ESH Oversight

The ESH Section is responsible for providing laboratory oversight of the NuMI civil construction project. This is done through the assignment of a construction safety coordinator who attends the pre-bid and pre-construction meeting with Ragner Benson to assure they understand Fermilab's ES&H requirements, conducts daily site inspections to observe subcontractor compliance with the standards and requirements established in the contract, and attend weekly NuMI ES&H inspections and close-out meeting, attends special safety subject meetings, and performs incident follow-up.

The ESH Section also provides oversight of the environmental protection program through weekly sampling of the outfalls at the NuMI construction site.

Any concerns identified are brought to the attention of the NuMI ESH Coordinator or NCMO Field Safety Coordinator to action. They are also documented to assure appropriate level of tracking.

2.2 Ragner Benson Inc.

2.2.1 Project Manager

The Ragner Benson Project Manager has the overall responsibility to see that the ES&H program is effective. He is responsible for planning and executing all work in compliance with ES&H requirements. He corrects substandard safety conditions. He takes immediate action with the superintendent, foremen and subcontractor management to correct negative safety records.

2.2.2 General Superintendent

The General Superintendent is responsible for implementing and enforcing Ragner Benson ES&H program. This includes correcting unsafe practices, enforcing safety regulations, assuring appropriate training, and inspecting the job site and correcting noncompliances.

2.2.3 Job Foreman

The Job Foremen instruct workers on safe working practices. They supply and enforce the wearing of appropriate personal protective equipment. They conduct inspections and investigations and take corrective action. They are expected to set the example for the workers. The foremen are responsible for pre-job briefings and hazard analysis review with the workers, as well as conducting the weekly toolbox talks.

2.2.4 ESH Manager

The Ragner Benson Safety Manager administers the Ragner Benson ES&H program. He investigates and reviews accident reports and recommends corrective action. He is responsible for the submittal of all required reports. He conducts required orientation and training. He maintains and makes available the personal protective equipment necessary for the work activity. He conducts inspections of the work site and brings unsafe conditions and practices to the foreman's attention.

3.0 Competence Commensurate with Responsibilities

It is important that each one of these key individuals have the expertise to tackle their assignment. Each has brought a wealth of technical and ES&H expertise to the project.

In addition, special training has been provided as appropriate. All have taken the MSHA 30 hour Inexperienced Miner Training and/or a Fermilab Mine and Tunneling Safety Awareness Training course. The NuMI Construction Project Deputy Manager, the Construction Coordinators, the NuMI Construction ES&H Support and the ESH Construction Safety Coordinator have taken a 24 hour Fermilab Construction Management and Safety Course. They have all taken the 30 hours OSHA Construction Safety Course. They have all received training in incident investigation and scene preservation as well.

4.0 Balance Priorities

The key to balancing priorities is assuring the decision makers, in this project the NuMI Project Manager and NuMI Construction Project Manager, are provided accurate information about the work activity, schedule, costs, hazards, risks, and controls. These are discussed with Ragner Benson during the weekly progress meeting. This is also achieved through NCMO daily work planning meetings and weekly NuMI Project staff meetings.

5.0 Identification of Safety Standards and Requirements

5.1 Work Smart Set

The Work Smart (formerly Necessary and Sufficient) Standards Set itemizes all the ES & H laws, regulations, and standards to which Fermilab, including the NuMI Project must adhere. The standards set is part of Fermilab's contract with the Department of Energy and can be found at <http://www-lib.fnal.gov/library/worksmart/worksmart.html>. They were last reviewed/updated August 2001.

5.2 FESHM

The FESHM is Fermilab's document that describes how Fermilab implement's its ES&H Program. Various chapters have requirements for subcontractors included within them. For example, Chapter 7010 describes requirements for subcontractors and identifies roles and responsibilities of the line manager. Chapter describes Fermilab's confined space program and sets forth requirements for subcontractors entering into our previously identified confined spaces. Because the FESHM is not readily available to subcontractor and lower-tier subcontractors, the specific requirements for subcontractors have been pulled from the FESHM and have been incorporated into Exhibit A (Schedule and

Supplemental Terms and Conditions) of the contract between Fermilab and S. A. Healy.

5.3 Contract between Ragner Benson and Fermilab

The contract with between Ragner Benson and Fermilab requires that Ragner Benson comply with all applicable 10 CFR 1910 and 1926. Additionally, it requires that Ragner Benson have in place an ISM & ES&H program that assures workers a safe working environment. It also flows down the requirements for integrated safety management (FL-3). There are specific requirements in the contract, such as requirements for safety professionals, confined space programs, hazard analysis programs, etc. These are detailed in Exhibit A of the contract.

5.4 Ragner Benson Safety Manual and ISM Plan

Ragner Benson submitted for Fermilab's review and acceptance a description of their ES&H Program. The Safety Manual describes line management responsibilities, specific hazard controls and ES&H standards, training requirements, etc. The ISM Plan defines Ragner Benson process for integrating safety into project plan.

6.0 Hazard Controls Tailored to Work

6.1 Hazard Analysis

Ragner Benson has a defined hazard analysis (HA) process. Their workers have been trained in its use. During the daily pre-job briefing the hazard analysis applicable to the planned work is reviewed within each individual workgroup. Changes or new hazard analyses may be developed at that time as well. When hazard analyses are changes, or a new HA is developed, the workers review and sign to indicate acceptance of the requirements within the HA.

6.2 Personal Protective Equipment

By policy, Ragner Benson and the NCMO Construction Manager has determined that all individuals entering the construction site must wear hard hats, safety glasses with side shields, and safety shoes. Those individuals who enter the underground facilities must also wear hearing protection were defined. All visitors to the site must review and sign the site hazard analysis before going onto the site which is located in the NuMI construction trailer.

6.3 Training by Fermilab

Fermilab requires all subcontractor to take Fermilab Subcontractor Orientation. This course sets forth to the worker Fermilabs' expectation that they will work safely. It also provides information for raising concerns if their management is

not responsive to safety issues. Fermilab has provided a copy of the video to Ragner Benson and it has been incorporated into their orientation. The NCMO Field Safety Coordinator and ESH Section Representative reviews attendance sheets. The Ragner Benson ESH Manager signs the orientation card documenting attendance.

Fermilab also provides training on those hazards unique to Fermilab. This includes radiation safety and oxygen deficiency hazard training.

6.4 Training by Healy

Ragner Benson provides a two and one half hour ESH training for all employees and sub-contractor employees. The covers general construction safety topics as well as access procedures for the underground facility including emergency procedures and training on the use of the self-rescuers.

7.0 Operations Authorization

7.1 Work Notification

At the start of the civil construction phase of the project, a work permit and notification was issued, per FESHM 2020. A WPN is a work planning tool intended to provide timely notification of a proposed construction project or work activity that will have impact beyond a particular organizational group and/or the specific system or area affected by the work. It lists (identifies) applicable permits, site-specific training requirements, and organizations that need to be notified prior to the commencement of on-site work activities. The use of this form will serve as a reminder and as a checklist to identify hazards or other aspects of the work activity that are controlled by practices or requirements specific to Fermilab, as well as documenting the authorization to commence work by the landlord division/section.

7.2 Daily Ragner Benson holds daily huddles/job briefings/hazard analysis review

Ragner Benson begins each work shift with a job briefing. It starts with a big meeting, and then the individual work groups meet to discuss their individual work group activities. Details of the work expected to be conducted that day are shared with the workers. The hazard analysis is reviewed/revised/prepared based upon input from the workers.

7.3 Monitoring by Ragner Benson

7.4 Monitoring by Fermilab

7.4.1 Monday meeting

Fermilab ES&H support personnel meet every Monday with Ragner Benson ES&H personnel to current and upcoming ES&H issues. This allows for open communication, a consistent message being shared, and timely issue management. Minutes are kept and shared with the attendees.

7.4.2 Weekly scheduled inspections

Every Thursday morning there is a scheduled NuMI ES&H Management walkthrough of the NuMI construction site. Representatives from DOE-FAO, NuMI Project and Construction Management (Construction Coordinator), ESH Section, and Ragner Benson tour the work site. Observations are documented and ES&H deficiencies are noted in the inspection database. A report is issue to Ragner Benson for followup. A separate procedure has been developed to discuss this activity in greater detail.

7.4.3 Unscheduled inspections

The Construction Coordinators, Construction Safety Coordinator, and ESH Oversight personnel conduct unscheduled inspections throughout the week to assure compliance with applicable ES&H standards. Results are documented in daily log, e-mail, etc. Findings entered into the database and are communicated during the Thursday close out meeting and in writing to Ragner Benson.

7.4.4 Weekly progress meeting

Ragner Benson conducts a weekly progress meeting (Wednesday at 9 am). ES&H issues are the first item on the agenda. Minutes are kept and are part of the project file.

7.4.5 Daily consultation

The ES&H support personnel are available on a daily basis to consult with the construction coordinator on ES&H issues. These individuals are available to assist construction coordinator with items such as hazard analysis review, ES&H issue resolution, and training.

7.4.6 Incidents/Investigations

Should an incident occur, Ragner Benson is responsible for responding to the scene, dialing 3131 to activate the Fermilab Emergency Response Plan. They are also responsible for notifying the Construction Coordinator. Depending on the severity of the incident, the Construction Coordinator initiates the emergency call tree to assure all appropriate personnel are notified in a timely manner.

After termination of the emergency phase, the scene is returned back to Ragner Benson. Should the incident involve something that is likely to result in a Type A or B investigation (per DOE O225.1), the Fire Department will secure the scene, placing it in a safe shutdown mode (with assistance from Ragner Benson and turn the scene over to the ESH Oversight personnel for further action.

Ragner Benson is responsible for investigating the incident and providing a written report to the NCMO Construction Manager within 48 hours. If the incident involves a recordable injury, NuMI ESH Coordinator is expected to generate a CAIRS within 48 hours. The NuMI ESH Coordinator reviews the CAIRS report for completeness. Direct, root, and contributory causes are expected to be identified. Corrective actions are expected to be determined and quickly implemented. If the report is not complete, the NuMI ESH Coordinator will sit down with Ragner Benson to discuss his concerns and reach consensus. The NuMI Project ES&H Coordinator is responsible for entering information into the Fermilab injury/illness database. The NCMO Field Safety Coordinator will conduct followup to ensure actions are complete.

7.4.7 ESH Inspection Finding database

All inspection findings are placed into the NuMI Project ESH Inspection Finding database. The NCMO Field Safety Coordinator or NCMO Environmental is responsible for entering this information into the database. He generates a report for the NCMO Construction Manager to submit to Ragner Benson for action. He follows up to assure action has been taken, and closes out the finding in the database.

The NuMI Project ES&H Coordinator and ESH oversight personnel also use this database to identify issues and trends that may indicate potential for injuries.